SPECIFICATIONS

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FOR A

FIRST ORDER LANTERN.

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SPECIFICATIONS

FOR A

FIRST ORDER LANTERN.

Plate 25, of the U. S. L. H. portfolio, shows a sectional elevation of a first order lantern adapted to a masonry tower. Since this plate was engraved there have been made, in sundry details of construction, modifications to which attention will be called in the proper places.

Above the gallery the lanterns for both masonry towers and iron structures will be alike.

When the lantern is intended for a brick parapet, the gallery will be of cast iron, made as shown on plate 20, V, in sixteen (16) equal segments, two (2) of which will have their inner ends "stopped off" on the line C D E, to accommodate the inner stairway; one of the others will contain an opening $5\frac{1}{2}$ inches diameter for a stove-pipe—the centre of the hole to be 5 feet from the axis of lantern. When the lantern surmounts a brick parapet.

The upper surfaces of gallery must be checkered or roughened to a depth of $\frac{3}{32}$ of an inch. Least thickness of metal $\frac{1}{2}$ inch. All surfaces of contact, such as joints, recesses for lantern posts, &c., must be planed. The segments will be connected together, at each joint, with four (4)—instead of 3, as marked on the drawing—wrought-iron bolts $\frac{5}{8}$ inch diameter, tool finished.

Each alternate lantern post will descend two (2) feet below the lower lantern panel, or sill, and be anchored in the wall by means of a wrought-iron bar $1\frac{1}{2}'' \times \frac{1}{2}''$ and 12 inches long; the bar passing through a slot in the lower end of post in the direction of a radial line drawn from the axis of lantern. The intermediate lantern posts will descend ten (10) inches below the mullion sill.

The gallery railing to be of wrought iron; the standards to be "finished," and of the sizes shown on plate 20, V. Their lower ends will be secured to the gallery by means of wrought-iron nuts and washers; the upper Gallery railing.

ends to the rail with finished brass nuts having closed ends. The screw cut on the upper end of the standard to be $\frac{5}{8}$ inch diameter, instead of $\frac{3}{4}$ inch, as drawn. The rail will be of bar iron $1\frac{1}{2}'' \times \frac{3}{4}''$, made in four equal segments, with scarf joints; the scarfs being two inches long, and secured over the standards with the brass nuts above mentioned.

Inner stairway.

The inner stairway leading to the gallery (see plate 20, V) will consist of cast-iron treads, whose outer ends are built in the brickwork; their inner ends are sustained by finished wrought-iron standards of a least diameter of one inch. The treads must be checkered or roughened on the upper side to the depth of $\frac{1}{16}$ of an inch. The upper and under surfaces in contact with the standards must be planed. The lower standard must be bolted to the lantern deck, the upper one to the gallery.

Air registers.

The air registers (6 in number) to be of the form and dimensions shown on sheet 13 of CAPE ANN LIGHT-HOUSE. The pipe and cowl to be of sheet copper, one-sixteenth ($\frac{1}{16}$) of an inch thick. Least internal diameter of pipe six (6) inches. All its parts must be securely brazed together. The valve and seat to be of gun metal, finished all over; seat to be securely brazed to the enlarged end of the pipe. The registers will be suitably distributed around in the parapet, care being taken not to interfere with the other metal work. Each register must be placed close up under the gallery.

Parapet door.

The door in the parapet is not considered a part of the lantern, and, consequently, will be furnished by the contractor for the metal work of the tower. (See "Specification for First Order Light-house.")

What the contractor for lantern must furnish.

The contractor for First Order Lantern for a masonry parapet must furnish the lantern gallery, and all above it, with the inner stairway leading to gallery, and the air registers.

When the lantern is intended for an iron structure, the gallery will be of cast iron, made as shown on sheet 14 of SOUTHWEST PASS LIGHT-HOUSE, in sixteen (16) equal segments, with the necessary modifications for inside stairway, outside ladder, and air registers. On the underside of each segment there is provided a curved flange, the inner radius of which is six (6) feet, its thickness is 1 inch. This will lap over, and be riveted or bolted to the iron parapet. The radial joints, the recesses for the lantern posts, and surfaces in contact with the gun-metal mullion sill must be planed. The surfaces in contact with the railing standards must be bored and faced. The segments will be connected together at each joint with six (6) wrought iron, tool-finished bolts, $\frac{3}{4}$ inch diameter; two of which pass through and secure each lantern post.

Lantern for an iron parapet.

The gallery plates will be checkered to the depth of $\frac{1}{8}$ of an inch. Least thickness of metal $\frac{1}{2}$ an inch; flanges $\frac{7}{8}$ inch and 1 inch. The railing standards will be of wrought iron, tool-finished. They are to be sufficiently high to allow the rail to be on a level with the mullions which separate the middle and lower lights of the lantern. Diameter of lower part $1\frac{1}{4}$ inch, tapering to $\frac{3}{4}$ of an inch at the top under the collar; above the collar they will have screw ends $\frac{5}{8}$ inch in diameter. The lower ends will be secured to the gallery plates by means of collars $2\frac{1}{2}$ inches diameter, and wrought-iron nuts and washers. The rail will be of bar iron $1\frac{1}{2}'' \times \frac{3}{4}''$, made in four equal segments with scarf joints; the scarfs being 2 inches long. The rail will be secured over all the standards with finished brass nuts having closed ends.

Air registers.

The air registers are formed by means of channels cast in each alternate gallery plate, over which are placed the mullion sills, so modified as to contain grid-iron valves, (see sheet 14 S. W. Pass L. H.) The sliding surfaces must be planed, and the openings filed out. A stop must be inserted at each end of the slide to regulate its stroke.

The remaining parts of lantern, which will now be described, (except so much as relates to the lower ends of lantern posts and the modified mullion sills,) are the same for both brick and iron structures.

Lantern posts.

The lantern posts, sixteen (16) in number, will be of wrought iron, $3\frac{3}{4}$ inches wide by $1\frac{1}{4}$ inch thick when finished. Each post must be lined on the outside with gun-metal rebates and stops for the glass; each made in 3 pieces, and each rebate secured with 4 gun-metal screws $\frac{5}{16}$ inch diameter. The lower glass stop will be secured with three (3) and the two upper ones with five (5) gun-metal screws.

Two gun-metal handles must be secured to each post with the screws used for the glass stops; both being secured together, (see sheet No. 27, S. W. Pass Lt. Ho.) The front of the iron lantern posts, the rebates and glass stops must be planed. The handles must be finished all over.

Mullion sills.

The mullion sills to be of gun metal, (9 of copper to 1 of tin.) Thickness of sides and bottom $\frac{3}{8}$ inch; flanges, inclusive of chipping pieces, $\frac{7}{8}$ inch. The rebates and glass stops, the flanges adjoining the lantern posts, and the undersides, in contact with the gallery plates, must all be planed. Each glass stop will be secured with three gun-metal screws $\frac{5}{16}$ inch. diameter. The sills will be secured to each lantern post with one wrought-iron tool-finished bolt, $\frac{7}{8}$ inch diameter, with suitable nut and washer.

Mullions.

There will be two (2) sets of intermediate mullions, made of gun metal, of form and dimensions shown on sheet No. 27, of S. W. Pass Lt. Ho.

Rebates, glass stops, and end flanges must be planed. Each glass stop will be secured with three gun-metal screws. The mullions will be secured to each lantern post with four (4) wrought-iron tool-finished bolts, $\frac{5}{8}$ inch diameter, furnished with suitable nuts and washers.

Cornice segments.

The cornice segments to be of gun metal, of the form and dimensions shown on sheet No. 26, S. W. Pass L. H. (It will be seen upon inspection, that this cornice is materially different in its construction from that shown on the elevation of lantern, plate 25 of the portfolio, and sheet 10 of S. W. Pass L. H; the cornice there shown being formed of sheet copper, on a frame work of iron, and is much more complex than the one now adopted.)

The rebates, glass stops, end flanges, and the recesses for the lantern posts, must all be planed. The flange for the rib of dome must be faced where it forms a surface of contact. In front of each alternate lantern post, there must be formed in the segments a spout for draining the gutter; its internal diameter $1\frac{1}{2}$ inches. The segments will be secured together at the upper part, by means of the flanges in the gutter, with two gun-metal bolts at each joint. Bolts $\frac{1}{2}$ inch in diameter, and provided with suitable nuts and washers. The lantern posts enter the segments 7 inches; their width being reduced to $2\frac{1}{2}$ inches. The segment will be further secured together on the inside of lantern with wrought-iron bolts, $\frac{3}{4}$ inch diameter, furnished with suitable nuts and washers; all to be tool-finished. There is but one flange to each segment by which each dome-rib and tie-rod are secured.

Lantern ladder.

The upper (movable) ladder of lantern to be of wrought iron, of the form and dimensions indicated on sheet 27 of the S. W. Pass L. H.

The stringers to be $2'' \times \frac{3}{8}''$; their distance apart from out to out 12 inches. Hooks are formed on the upper ends for grasping the outer flange of cornice. Each tread is formed of two rods, $\frac{1}{2}$ inch diameter, placed so as to be horizontal when the ladder is in place against the lantern. The rods are reduced to $\frac{1}{4}$ inch diameter, where they enter the stringers, to which they must be riveted.

Framing of dome.

The ribs and the tie-bars forming the frame of dome, to be of wrought iron. Ribs $2'' \times \frac{1}{2}''$; tie-bars between the ribs same size. The lower end of each rib will be secured to the flange of the cornice segment with three wrought-iron bolts, $\frac{5}{8}$ inch diameter, furnished with suitable nuts and washers. The upper flanged end must be secured to the cast-iron crown piece with one wrought-iron bolt $\frac{5}{8}$ inch diameter. The tie-bars must be secured to each rib with two wrought-iron bolts $\frac{1}{2}$-inch diameter.

Spider frame.

The spider frame supporting the adjustable bearing for the upper part of the lens apparatus, is to be of wrought iron of the form and dimensions shown on sheet 26 of S. W. Pass L. H.

Tie-rods.

The tie-rods, sixteen (16) in number, are $1\frac{1}{2}'' \times \frac{1}{2}''$. The outer end of each must be secured to the cornice segment with one wrought-iron bolt $\frac{5}{8}$ inch diameter; each inner end has a screw cut on it, $\frac{3}{4}$ inch in diameter, whereby it is secured to a wrought-iron ring $1\frac{3}{4}'' \times 1\frac{3}{4}''$, with nuts inside and out for adjustment. Every alternate tie-rod is supported by a wrought-iron rod, $\frac{5}{8}$ inch diameter, whose upper end is secured near the crown of dome with one bolt $\frac{1}{2}$ inch in diameter; the lower end is secured to tie-rod with a same sized bolt. Cast-iron turnbuckles are provided for adjustment.

Adjustable bearing for lens apparatus.

The adjustable bearing of the lens apparatus to be of brass, finished bright all over, and well fitted and secured with gun-metal screws to the wrought-iron ring. The set-screws to be of steel, $\frac{3}{8}$ of an inch in diameter.

Copper dome.

The dome must be covered with sheet copper one-sixteenth ($\frac{1}{16}$) of an inch thick, laid on in sixteen (16) equal segments with lock joints; to be secured to each rib with six (6) gun-metal screws $\frac{1}{4}$ inch diameter, penetrating the iron $\frac{1}{2}$ inch. The copper will also be secured to each cornice segment by means of a gun-metal strip $1\frac{1}{4}'' \times \frac{3}{8}''$, with the same number of the same kind of screws. (When the lantern is finally erected on the light-house, all the joints must be soldered and made water-tight.)

Ventilator.

The globe and other parts of the ventilator are to be of sheet copper, one-sixteenth ($\frac{1}{16}$) of an inch thick, weighing not less than forty-six and one quarter ($46\frac{1}{4}$) ounces per superficial foot. The globe is 2 feet 4 inches diameter, and has in its lower part two rows of holes, each containing 24, and each hole 2 inches diameter. The ventilator pipe is 1 foot 7 inches external diameter. The lower part is moulded into the form of a scotia, the base of which is 2 feet 7 inches in diameter, having on it a flange 3 inches wide which will be soldered to the dome when finally erected on the light-house. The upper part of the pipe is perforated with fourteen rectangular openings, each $4\frac{1}{2}'' \times 2''$. The globe passes over the pipe to which it is secured with 12 rivets, $\frac{1}{4}$ inch in diameter.

Pinnacle.

A gun-metal nut and pinnacle are soldered to the top of the globe. The total height of nut is $6\frac{1}{2}$ inches; diameter of its base, 8 inches; diameter of body, 3 inches. The pinnacle projects 4 feet above the nut into which it is screwed, and must be furnished at the top with a platinum point worth $4. The diameter of the lower part of the pinnacle is $1\frac{1}{2}$ inch, tapering to $\frac{1}{2}$ inch at the top.

Crown piece of dome.

The cast-iron crown piece of dome is shown on sheet 26 of S. W. Pass L. H. It consists of a ring having an internal diameter of 12 inches, depth 4 inches, and thickness 1 inch. All the ribs of dome are clustered together and let into the notches on the outside of the ring, to which they are also bolted. The crown piece has four arms $4'' \times \frac{3}{4}''$, sustaining a central socket 3 inches diameter by $4\frac{1}{2}$ inches long, into which a wrought-iron bolt $1\frac{1}{2}$ inch diameter enters, and is secured by means of its collar and a nut and washer of suitable size. The bolt passes upward, and is screwed into the nut on the top of the globe, thereby fixing all parts of the ventilator firmly together. The socket in the crown piece must be bored and faced, and the bolt turned to fit it. The notches for ribs must be planed.

Lining of dome.

The inside of dome must be lined with sheet zinc one thirty-second ($\frac{1}{32}$) of an inch thick, put on in sixteen (16) equal segments, with $\frac{3}{4}$ inch lap at the joints and fastened to each rib with not less than six (6) wrought-iron screws.

Tin shelter for lens.

To prevent all drip or leakage from falling upon the lens apparatus, a cone and cowl formed of the best XX tin, is placed over it and fastened by 8 screws to the horizontal tie rods. The cone, or rather frustrum, is 7 feet diameter at the base, with a flange 2 inches wide projecting beyond it. Height of frustrum 2 feet; diameter at the top (size of opening) 6 inches. The cowl, which is 12 inches diameter and 4 inches high, is placed $1\frac{1}{2}$ inch above the frustrum, and secured with four standards.

PAINTING.—*After inspection* at the workshop, all parts of the lantern must have two (2) coats of white lead, in oil. When finally erected, the lantern must have two (2) additional coats of paint, of such colors as may be directed, (generally white inside and black outside.)

Marking.

All parts of the work must be properly marked with a chisel or centre-punch, when the materials will bear it; when otherwise, it must be painted.

Boxing.

All parts of the lantern must be substantially boxed and strapped with iron. Contents of each box marked on its outside.

All castings, hereinbefore specified as gun-metal, must consist of 9 parts of copper with 1 part of tin; (zinc must, *in no case*, be substituted for tin.)

All castings must be made perfectly sound and true, or they *will be rejected*. The wrought iron must be of the best quality, made from charcoal blooms, tough and fibrous. The entire work must be erected and fitted together at the workshop, and executed in the best manner, to the satisfaction of an authorized agent of the Light-house Board.

List of Drawings wholly or partly used in the construction of a First Order Lantern.

Plate 25.

Plate 20, V.

Sheet No. 13, Cape Ann Light-house.

Sheet No. 10, of Southwest Pass Light-house.

Sheet No. 14, do. do. do.

Sheet No. 26, do. do. do.

Sheet No. 27, do. do. do.

When the lantern is for a masonry tower, omit sheets Nos. 10 and 14 of Southwest Pass Light-house.

When the lantern is for an iron structure, omit plates 25 and 20 V, and sheet 13 of Cape Ann Light-house.

JUNE, 1862.